Veterinary Dermatology
Dermatologie vétérinaire

Treating pyoderma without the use of systemic antibiotics

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We have become accustomed to treating widespread superficial pyoderma (Figure 1) with systemic antibiotics. Often these cases are recurrent, due to underlying allergic disease, endocrinopathies, or immune-compromise, and many patients require repeated courses of antibiotics. Recurrent exposure to antibiotics increases the risk of developing resistant infections (1,2). A thorough search for the underlying etiology is essential for resolution of recurrent infections. However, in order to diagnose and control the underlying condition, treatment and control of these secondary infections is essential. Newer evidence (3,4), combined with the alarming rise in methicillin-resisitant *Staphylococcus pseudintermedius* (MRSP) infections (1,3), has led to a shift from previous recommendations of using systemic antimicrobials for treatment of superficial pyoderma to using topical therapy whenever possible.

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Topical therapy decreases the risk of development of MRSP infection (3,4). Topical antimicrobials hasten the resolution of superficial infections when combined with systemic antimicrobials (5,6). Topical treatments can help to improve the epidermal barrier, and replace lost epidermal moisture (6). Additionally, higher concentrations of active ingredients can be achieved with topical application, often easily exceeding minimal inhibitory concentrations (MIC's) of the organisms involved (6,7). Topical therapy may be implemented without culture and sensitivity testing; MRSP and methicillin-susceptible *S. pseudintermedius* (MSSP) are often equally susceptible to many topical treatments. Even if systemic therapy is required, combination topical therapy will decrease the time to clinical cure (3), and reduce the likelihood of a resistant bacterial population surviving within the cutaneous microflora.

Recently, Clinical Consensus Guidelines were published by the World Association for Veterinary Dermatology for the treatment of methicillin-resistant staphylococcal (MRS) species (3). Recommendations included the following:

Clinical consensus statement 5: *Topical therapy, using antibacterial agents with proven anti-staphylococcal efficacy, is the recommended treatment modality for any surface and superficial pyoderma involving MRS, particularly those with localized lesions, and for otitis and superficial wound infection.*

Clinical consensus statement 6: *Topical therapy should be used as the sole on-animal antibacterial treatment for surface and superficial infections whenever a pet and owner can be expected to be compliant.*

Antibacterial agents with proven anti-staphylococcal efficacy include chlorhexidine (3,5,8), miconazole (8), benzoyl peroxide (3), fucidic acid, mupirocin (7), polymyxin-B, and silversulfadiazine. There is evidence that sodium hypochlorite (bleach)

Figure1. Superficial pyoderma. Multifocal patches of alopecia and erythema, with epidermal collarettes and crusts. Cytology should be performed under the crusts and on the edges of the lesions. Photo credit: B. Valentine.

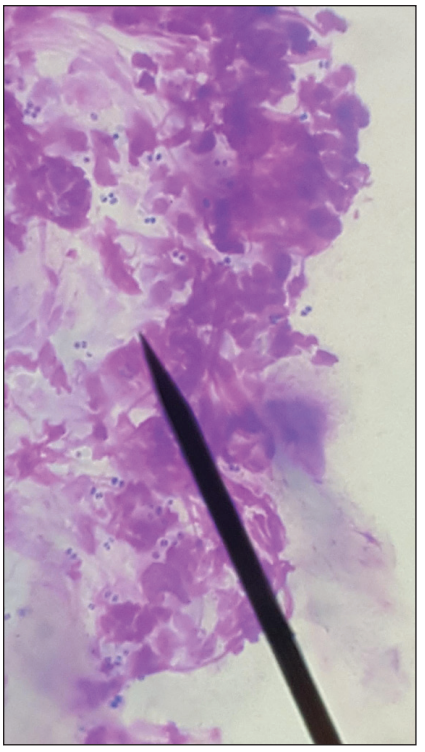

Figure 2. Intracellular cocci found on superficial cytology by gently rubbing a swab across an epidermal collarette. Photo credit: Jennie Tait, RVT.

is anti-staphylococcal and effective against MRSP, and there is good evidence for the use of medical honey (5).

There is good evidence for the use of chlorhexidine, and to a lesser extent benzoyl peroxide, for bacterial skin infections. This is irrespective of methicillin-resistant status. Chlorhexidine and benzoyl peroxide shampoos resolved or substantially improved clinical signs within 3 weeks in most dogs with MSSP and those with MRSP (5,6). Topical therapy with twice weekly 4% chlorhexidine shampoo combined with daily 4% chlorhexidine spray was found to be as effective as systemic antibiotic therapy in dogs with superficial pyoderma, whether infected with MSSP or MRSP (9).

Benzoyl peroxide (shampoo, creams, and gels; 2.5% to 10%) has shown good efficacy at twice weekly bathing. In one study of 22 dogs with superficial pyoderma it was as effective as 3% chlorhexidine in achieving a microbial cure; although chlorhexidine produced better clinical results (3,5). Benzoyl peroxide also has keratolytic, comedolytic, and anti-inflammatory properties (5). It can be effective in treating superficial *S. pseudintermedius, Pseudomonas aeruginosa,* and *Malassezia pachydermatis* infections.

Miconazole has been shown to be effective against *Staphylococcus* (8), and a combination miconazole/chlorhexidine product has been shown to have a synergistic effect against MRSP (5,6). Combination miconazole and polymyxin B is effective against MRSP and methicillin-resistant *Staphylococcus schleferi.*

Mupirocin is effective against both MRSP and MSSP (7). This is a controversial treatment option as mupirocin is an important topical antimicrobial in both veterinary and human medicine, one to which significant resistance has not been developed. In this author's opinion, considering the efficacy of other topical antimicrobials, we should all strive to avoid the routine use of this important antimicrobial. Fucidic acid is effective against MSSP and MRSP (5,7,8). It is available as a topical gel and can be used for localized pyoderma, such as pyotraumatic dermatitis. It may be used for localized lesions in conjunction with antibacterial shampoo.

Other treatments that are used include accelerated hydrogen peroxide compounds, acetic acid and boric acid products, and dilute hypochlorite solution.

When treating a superficial pyoderma with topical antimicrobials consideration of the level of pruritus and inflammation is also important. If the patient is pruritic, addressing the itch can help with comfort, as well as resolution, by reducing self-trauma to the skin. A short course of anti-pruritic doses of corticosteroids, oclacitinib, or lokivetmab can be helpful. Using a short course, an appropriate dose, and adjunct topical antimicrobial therapy will mitigate the risks associated with using these medications in the face of pyoderma.

Topical therapy is generally much more effective than systemic therapy in cases of otitis externa (10). Based on cytology, topical therapy targets inflammation and infection, and typically exceeds the MIC reported by bacterial culture and antimicrobial susceptibility testing. Culture and susceptibility testing are based on systemic levels of antibiotics, and must be interpreted with

caution (10) when treating otitis topically. Cytology should be performed in all cases of otitis, and topical therapy should be chosen according to the relevant cytology (Figure 2). Systemic therapy is reserved for otitis media, and should be based only on bacterial culture and antimicrobial susceptibility testing (10).

Topical therapy is attainable in our pets because infection on the skin is easily accessible. In addition, the MIC for topical antimicrobials is often attainable (8). Limitations for topical therapy include the temperament of the animal as well as owner compliance. There are many different methods of application, and owner compliance may be improved if the owner is able to help choose the best method for him/her and her/his pet. Shampoos, sprays, mousse, lotions, creams, and medicated wipes are all available with a variety of antimicrobials. There are fewer options in Canada than in the US; however, we now have various products containing 3% and 4% chlorhexidine which were previously unavailable (see CAVD's In-Clinic Tools). The owner must be educated about proper bathing techniques including using the right shampoo, using cool water, and avoiding the use of a hair dryer.

As always, with recurrent pyoderma, as well as recurrent otitis, a search for the underlying cause is essential in order to prevent recurrent infections. In the meantime, topical intermittent therapy can reduce infections while avoiding or reducing systemic antimicrobial use. Whether talking about the individual pet or on a population level, decreasing our reliance on systemic antimicrobials will decrease the possibility of bacteria becoming resistant.

References

1. Hensel N, Zabel S, Hensel P. Prior antibacterial drug exposure in dogs with meticillin-resistant *Staphylococcus pseudintermedius* (MRSP) pyoderma. Vet Dermatol 2016;27:72–78.
2. Eckholm NG, Outerbridge CA, White SD, Sykes JE. Prevalence of and risk factors for isolation of meticillin-resistant *Staphylococcus* spp. from dogs with pyoderma in northern California, USA. Vet Dermatol 2013; 24:154–161.
3. Morris DO, Loeffler A, Davis MF, Guardabassi L, Weese JS. Recommendations for approaches to meticillin-resistant staphylococcal infections of small animals: Diagnosis, therapeutic considerations and preventative measures: Clinical Consensus Guidelines of the World Association for Veterinary Dermatology. Vet Dermatol 2017;28:304–e69.
4. Zur G, Gurevich B, Elad D. Prior antimicrobial use as a risk factor for resistance in selected *Staphylococcus pseudintermedius* isolates from the skin and ears of dogs. Vet Dermatol 2016;27:468–e125.
5. Mueller RS, Bergvall K, Bensignor E, Bond R. A review of topical therapy for skin infections with bacteria and yeast. Vet Dermatol 2012;23:330–341.
6. Young R, Buckley L, McEwan N, Nuttall T. Comparative in vitro efficacy of antimicrobial shampoos: A pilot study. Vet Dermatol 2011; 23:36–40.
7. Loeffler A, Baines SJ, Toleman MS, et al. In vitro activity of fusidic acid and mupirocin against coagulase-positive staphylococci from pets. J Antimicrob Chemother 2008;62:1301–1304.
8. Clark SM, Loeffler A, Bond R. Susceptibility in vitro of canine methicillin-resistant and -susceptible staphylococcal isolates to fusidic acid, chlorhexidine and miconazole: Opportunities for topical therapy of canine superficial pyoderma. J Antimicrob Chemother 2015;70: 2048–2052.
9. Borio S, Colombo S, La Rosa G, De Lucia M, Damborg P, Guardabassi L. Effectiveness of a combined (4% chlorhexidine digluconate shampoo and solution) protocol in MRS and non-MRS canine superficial pyoderma: A randomized, blinded, antibiotic-controlled study. Vet Dermatol 2015;26:339–344.
10. Nuttal T. Successful management of otitis externa. In Practice 2016; 38:17–31.